CHAPTER 6

FUTURE DIRECTIONS IN THE UPPER ELK RIVER WATERSHED

6.1. BACKGROUND.

The Watershed Water Quality Management Plan serves as a comprehensive inventory of resources and stressors in the watershed, a recommendation for control measures, and a guide for planning activities in the next five-year watershed cycle and beyond. Water quality improvement will be a result of implementing both regulatory and nonregulatory programs.

In addition to the NPDES program, some state and federal regulations, such as the TMDL and ARAP programs, address point and nonpoint issues. Construction and MS4 stormwater rules (implemented under the NPDES program) are transitioning from Phase 1 to Phase 2. More information on stormwatrer rules may be found at: http://www.state.tn.us/environment/wpc/stormh2o/MS4.htm.

This Chapter addresses point and nonpoint source approaches to water quality problems in the Upper Elk River Watershed.

6.2. COMMENTS FROM PUBLIC MEETINGS. Watershed meetings are open to the public, and most meetings were represented by citizens who live in the watershed, NPDES permitees, business people, farmers, and local river conservation interests. Locations for meetings were frequently chosen after consulting with people who live and work in the watershed. Everyone with an interest in clean water is encouraged to be a part of the public meeting process. The times and locations of watershed meetings are posted at: http://www.state.tn.us/environment/wpc/public.htm.

6.2.A. Year 1 Public Meeting. The first Upper Elk River Watershed public meeting was held April 22, 1997 in Winchester. The goals of the meeting were to 1)present, and review the objectives of, the Watershed Approach, 2)introduce local, state, and federal agency and nongovernment organization partners, 3)review water quality monitoring strategies, and 4)solicit input from the public.

6.2.B. Year 3 Public Meeting. The second Upper Elk River Watershed public meeting was held October 26, 1999 at the Winchester Courthouse. The goals of the meeting were to 1)provide an overview of the watershed approach, 2)review the monitoring strategy, 3)summarize the most recent water quality assessment, 4)discuss the TMDL schedule and citizens' role in commenting on draft TMDLs, and 5)discuss BMPs and other nonpoint source tools available through the Tennessee Department of Agriculture 319 Program and NRCS conservation assistance programs.

6.2.C. Year 5 Public Meeting. The third scheduled Upper Elk River Watershed public meeting was held November 3, 2003 at the Winchester Courthouse. The meeting featured six educational components:

- Overview of draft Watershed Water Quality Management Plan slide show
- Benthic macroinvertebrate samples and interpretation
- SmartBoard™ with interactive GIS maps
- "How We Monitor Streams" self-guided slide show
- "Why We Do Biological Sampling" self-guided slide show
- Tennessee Valley Authority display

In addition, citizens had the opportunity to make formal comments on the draft Watershed Water Quality Management Plan and to rate the effectiveness of the meeting.

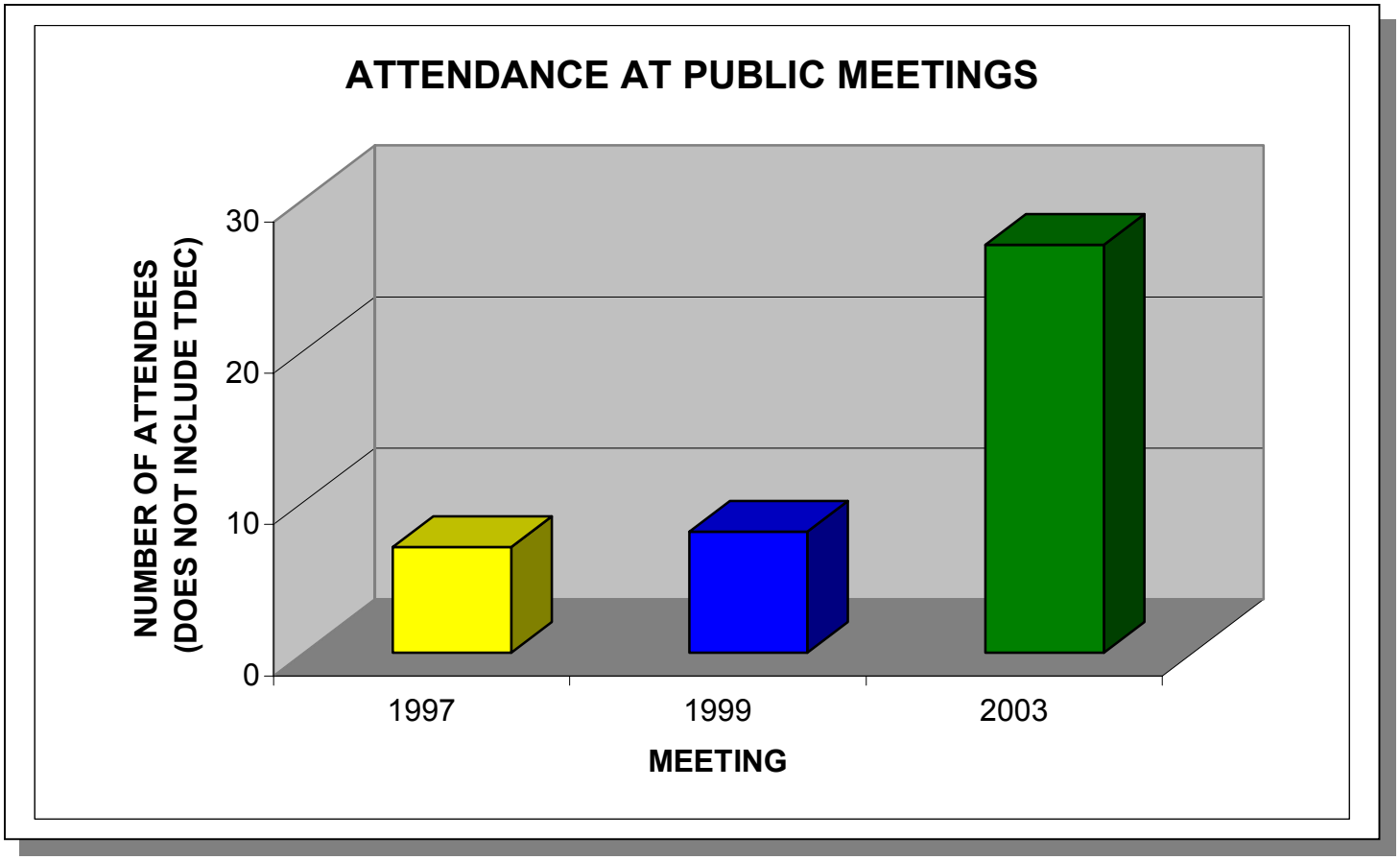

Figure 6-1. Attendance at Public Meetings in the Upper Elk River Watershed. *The 1997 and 1999 watershed meeting numbers represent Upper Elk River, Lower Elk River, Pickwick Lake, and Wheeler Lake, Watershed joint meetings.*

Figure 6-2. Informal discussions are important in meeting citizens' interest in understanding Water Pollution Control's activities in the watershed, and in communicating to the Department any concerns they might have.

Figure 6-3. Partners, like the Tennessee Valley Authority, are important in the watershed approach, and use the watershed meetings to communicate their activities to the public.

6.3. APPROACHES USED.

6.3.A. Point Sources. Point source contributions to stream impairment are primarily addressed by NPDES and ARAP permit requirements and compliance with the terms of the permits. Notices of NPDES and ARAP draft permits available for public comment can be viewed at http://www.state.tn.us/environment/wpc/wpcppo/. Discharge monitoring data submitted by NPDES-permitted facilities may be viewed at http://www.epa.gov/enviro/html/pcs/pcs_query_java.html.

The purpose of the TMDL program is to identify remaining sources of pollution and allocate pollution control needs in places where water quality goals are still not being achieved. TMDL studies are tools that allow for a better understanding of load reductions necessary for impaired streams to return to compliance with water quality standards. More information about Tennessee's TMDL program may be found at:
http://www.state.tn.us/environment/wpc/tmdl.php

TMDLs are prioritized for development based on many factors.

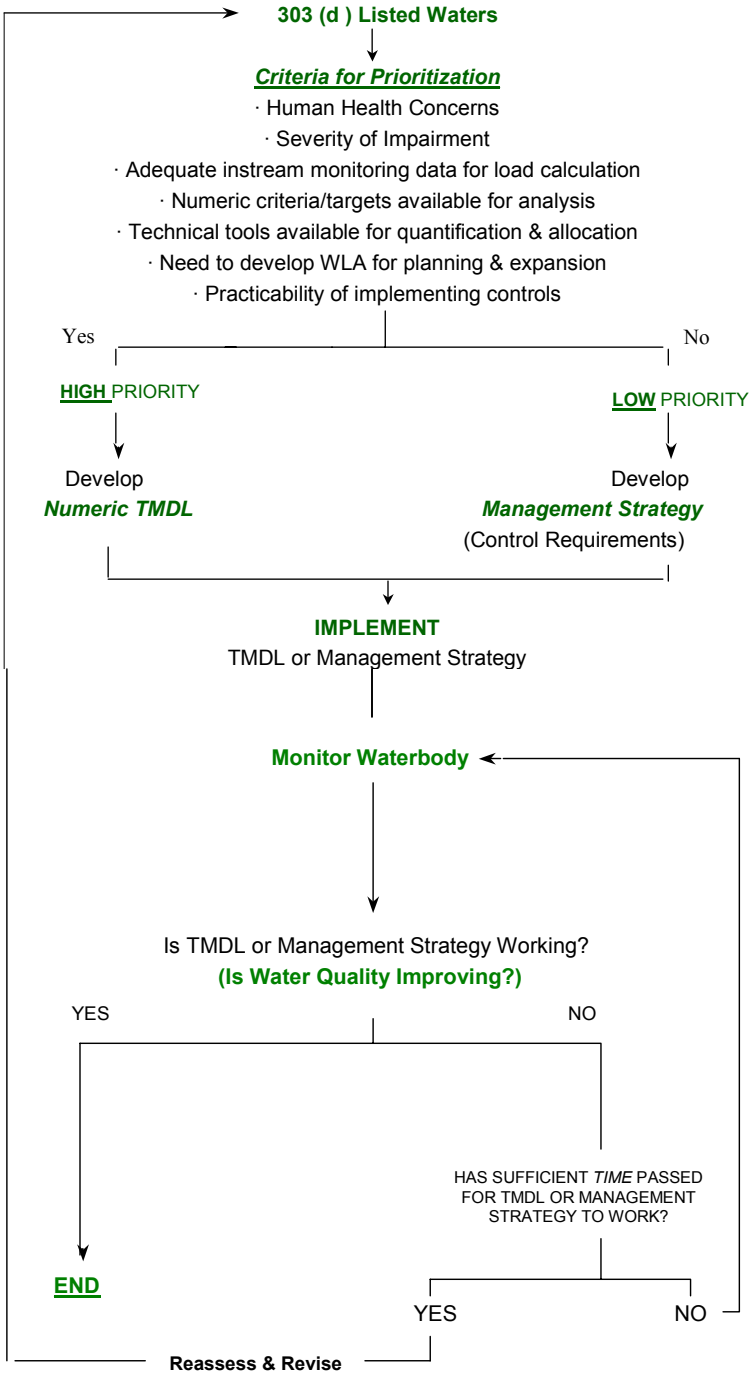

Figure 6-4. Prioritization scheme for TMDL Development.

6.3.B. Nonpoint Sources

Common nonpoint sources of pollution include urban runoff, riparian vegetation removal, and inappropriate land development, agricultural, and road construction practices. Since nonpoint pollution exists essentially everywhere rain falls and drains to a stream, existing point source regulations can have only a limited effect, so other measures are necessary.

There are several state and federal regulations that address some of the contaminants impacting waters in the Upper Elk River Watershed. Most of these are limited to only point sources: a pipe or ditch. Often, controls of point sources are not sufficient to protect waters, so other measures are necessary. Some measures include voluntary efforts by landowners and volunteer groups, while others may involve new regulations. Many agencies, including the Tennessee Department of Agriculture and NRCS, offer financial assistance to landowners for corrective actions (like Best Management Practices) that may be necessary for recovery of impacted streams. Many nonpoint problems will require an active civic involvement at the local level geared towards establishment of improved zoning guidelines, building codes, streamside buffer zones and greenways, and general landowner education.

The following text describes certain types of impairments, causes, suggested improvement measures, and control strategies. The suggested measures and streams are only examples and efforts should not be limited to only those streams and measures mentioned.

6.3.B.i. Sedimentation.

6.3.B.i.a. From Construction Sites. Construction activities have historically been considered “nonpoint sources.” In the late 1980’s, EPA designated them as being subject to NPDES regulation if more than 5 acres are disturbed. In the spring of 2003, that threshold became 1 acre. The general permit issued for such construction sites sets out conditions for maintenance of the sites to minimize pollution from stormwater runoff, including requirements for installation and inspection of erosion controls. Also, the general permit imposes more stringent inspection and self-monitoring requirements on sites in the watershed of streams that are already impaired due to sedimentation. Regardless of the size, no construction site is allowed to cause a condition of pollution.

Construction sites within a sediment-impaired watershed may also have higher priority for inspections by WPC personnel, and are likely to have enforcement actions for failure to control erosion. Historically, construction activities have not been a large source of the sediment problems within the Upper Elk River Watershed, due to the rather sparsely populated nature of most of the watershed. However, increased population growth in the urban centers of Fayetteville, Tullahoma, and Winchester/Decherd (among others) will require local regulation and oversight to prevent construction runoff from impacting area streams.

6.3.B.i.b. From Channel and/or Bank Erosion. Many streams in the Upper Elk River Watershed suffer from varying degrees of stream bank erosion. When stream channels are altered, or large tracts of land are cleared, increasing storm runoff, banks can become unstable and highly erodable. Heavy livestock traffic can also severely disturb stream banks. Destabilized banks contribute to sediment loading and accelerate the loss of riparian vegetation. This cycle is especially problematic in the headwater areas of the Upper Elk River Watershed, where the very sandy plateau soils and shallow rooted trees are especially vulnerable. Most of the land and channel alterations center on agricultural practices, including row-cropping too close to the stream and livestock grazing.

Several agencies such as the Natural Resources Conservation Service (NRCS) and the Tennessee Department of Agriculture (TDA), as well as watershed citizen groups, are working to stabilize portions of stream banks using bioengineering and other techniques. Many of the affected streams could benefit from these types of projects, including Stewart Creek, Pleasant Valley Creek, Little Swan Creek, Farris Creek, and West Cane Creek. Other methods or controls that might be necessary to address common problems are:

Voluntary activities

- Re-establishment of bank vegetation (examples: Coffee Creek, Robinson Creek, Little Cane Creek, Stephens Creek, and many others).
- Establish buffer zones along streams running through row crop fields or nurseries (examples: Blue Spring Creek, Gum Creek, Hessey Branch).
- Establish off-channel watering areas for cattle by moving watering troughs and feeders back from stream banks (examples: Short Creek, Shelton Creek, and Indian Creek).
- Limit cattle access to streams and bank vegetation (examples: Mud Creek, Yellow Branch, and Childer Creek).

Additional strategies

- Better community planning for the impacts of development on small streams, especially development in growing areas (examples: small streams in and around Tullahoma, Winchester, and Fayetteville).
- Restrictions requiring post construction run-off rates to be no greater than pre-construction rates in order to avoid in-channel erosion (examples: Wagner Creek, Blue Creek, and Rock Creek).
- Additional restrictions on logging in streamside management zones.
- Prohibition on clearing of stream and ditch banks (example: Gum Creek). *Note: Permits may be required for any work along streams.*
- Additional restriction to road and utilities crossings of streams.
- Restrictions on the use of off-highway vehicles on stream banks and in stream channels.

6.3.B.i.c. From Agriculture and Silviculture. Even though there is an exemption in the Water Quality Control Act stating that normal agricultural and silvicultural practices that do not result in a point source discharge do not have to obtain a permit, efforts are being made to address impacts due to these practices.

The Master Logger Program has been in place for several years to train loggers how to plan their logging activities and to install Best Management Practices that lessen the impact of logging activities. Recently, laws and regulations were enacted which established the expected BMPs to be used and allows the Commissioners of the Departments of Environment and Conservation and of Agriculture to stop a logging operation that has failed to install these BMPs and so are impacting streams. Only the headwater area of the Elk River on the plateau retains large tracts of forested land which have the potential to be affected by larger-scale logging operations.

Since the Dust Bowl era, the agriculture community has strived to protect the soil from wind and soil erosion. Agencies such as the Natural Resources Conservation Service (NRCS), the University of Tennessee Agricultural Extension Service, and the Tennessee Department of Agriculture have worked to identify better ways of farming, to educate the farmers, and to install the methods that address the sources of some of the impacts due to agriculture. Cost sharing is available for many of these measures. Agriculture is the most widespread land-use in the Upper Elk River Watershed, therefore impacting the greatest number of stream miles.

6.3.B.ii. Pathogen Contamination.

Possible sources of pathogens are inadequate or failing septic tank systems, overflows or breaks in public sewer collection systems, poorly disinfected discharges from sewage treatment plants, and fecal matter in streams and storm drains due to pets, livestock and wildlife. Permits issued by the Division of Water Pollution Control regulate discharges from point sources and require adequate control for these sources. Individual homes are required to have subsurface, on-site treatment (i.e., septic tank and field lines) if public sewers are not available. Septic tank and field lines are regulated by the Division of Ground Water Protection within the Columbia Environmental Assistance Center and delegated county health departments. In addition to discharges to surface waters, businesses may employ either subsurface or surface disposal of wastewater. The Division of Water Pollution Control regulates surface disposal.

Currently, only three stream systems in the Upper Elk River Watershed are known to have excessive pathogen contamination (however, many streams have not been screened). These are Juanita Creek (Grundy County), and Cane Creek and Swan Creek (Lincoln County). Juanita Creek is in a small urban area, with its bacterial contamination coming from stormwater runoff, failing septic systems, and sewage collection system leaks. Cane Creek and Swan Creek are in agricultural areas, with lare livestock operations generating great quantities of manure. Measures that may be necessary to control pathogens in these streams, and in others with less serious problems, include:

Voluntary activities

- Limiting livestock access to streams, including use of off-channel watering of livestock (example: Cane Creek).
- Proper management of animal waste from feeding operations (example: Swan Creek).
- Better maintenance of sub-surface disposal systems.

Enforcement strategies

- Greater enforcement of regulations governing on-site wastewater treatment.
- Timely and appropriate enforcement for non-complying sewage treatment plants, large and small, and their collection systems.
- Identification of Concentrated Animal Feeding Operations not currently permitted, and enforcement of current regulations.

Additional strategies

- Restrict development in areas where sewer is not available and treatment by subsurface disposal is not an option due to poor soils, floodplains, or high water tables. This is particularly important in the headwaters of the Elk River Watershed, given the geology of the Cumberland Plateau and Escarpment.
- Develop and enforce leash laws and controls on pet fecal material in areas with higher population densities.
- Greater efforts by sewer utilities to identify leaking lines or overflowing manholes, (example: Juanita Creek).
- More efforts by local urban public works and utilities to identify and control contaminated stormwater runoff sources entering storm sewer systems.

6.3.B.iii. Excessive Nutrients and/or Dissolved Oxygen Depletion.

These two impacts are usually listed together because high nutrients often contribute to low dissolved oxygen within a stream. Since nutrients often have the same source as pathogens, the measures previously listed can also address many of these problems. Elevated nutrient loadings are also often associated with urban runoff from impervious surfaces, from fertilized lawns and croplands, and inappropriate sewage disposal practices.

Other sources of nutrients can be addressed by:

Voluntary activities

- Educate homeowners and lawn care companies in the proper application of fertilizers.
- Encourage landowners, developers, and builders to leave stream buffer zones. Streamside vegetation can filter out many nutrients and other pollutants before they reach the stream. These riparian buffers are also vital along livestock pastures. Caney Hollow Creek, Factory Branch, Farris Creek, Dry Creek, and many others could benefit from buffer zones that filter nutrient runoff.
- Use grassed drainage ways that can remove fertilizer before it enters streams.
- Use native plants for landscaping since they don't require as much fertilizer and water.

Physical changes to streams can prevent them from providing enough oxygen to biodegrade the materials that are naturally present. A few additional actions can address this problem:

- Maintain shade over a stream. Cooler water can hold more oxygen and retard the growth of algae. As a general rule, all stream channels suffer from canopy

removal. An intact riparian zone also acts as a buffer to filter out nutrient loads before they enter the water.
- Discourage impoundments. Ponds and lakes do not aerate water, and can cause an increase in water temperature. *Note: Permits may be required for any work on a stream, including impoundments.*

Regulatory Strategies
- Greater enforcement of regulations governing on-site wastewater treatment.
- More stringent permit limits for nutrients discharged from sewage treatment plants (including Rock Creek and East Fork Mulberry Creek).
- Timely and appropriate enforcement for non-complying sewage treatment plants, large and small, and their collection systems.
- Identification of Concentrated Animal Feeding Operations not currently permitted, and enforcement of current regulations.

6.3.B.iv. Toxins and Other Materials.

Although some toxic substances are discharged directly into streams from a point source, much of these materials are washed in during rainfalls from an upland location or via improper waste disposal practices that contaminate groundwater. In the Upper Elk River Watershed, a relatively small number of streams are damaged by stormwater runoff from industrial areas or urban areas. More stringent inspection and regulation of permitted industrial activities, and local stormwater quality initiatives and regulations, could help reduce the amount of contaminated runoff reaching state waters. Examples of streams that would benefit from these measures include Wagner Creek, Rock Creek, and Blue Creek.

Woods Reservoir represents a particularly large-scale example of toxic releases into streams. Due to decades of PCBs being discharged into this impoundment of the Elk River, the bottom sediment has become highly contaminated, and the lake is now posted for fish consumption due to this legacy pollutant.

Many materials enter our streams due to apathy, or lack of civility or knowledge by the public. Litter in roadside ditches, garbage bags tossed over bridge railings, paint brushes washed off over storm drains, and oil drained into ditches are all blatant examples of pollution in streams. Some can be addressed by:

Voluntary activities
- Providing public education.
- Painting warnings on storm drains that connect to a stream
- Sponsoring community clean-up days.
- Landscaping of public areas.
- Encouraging public surveillance of their streams and reporting of dumping activities to their local authorities.

Needing regulation
- Prohibition of illicit discharges to storm drains.
- Litter laws and strong enforcement at the local level.

6.3.B.v. Habitat Alteration.

The alteration of the habitat within a stream can have severe consequences. Whether it is the removal of the vegetation providing a root system network for holding soil particles together, the release of sediment, which increases the bed load and covers benthic life and fish eggs, the removal of gravel bars, "cleaning out" creeks with heavy equipment, or the impounding of the water in ponds and lakes, many alterations impair the use of the stream for designated uses. Habitat alteration also includes the draining or filling of wetlands.

Measures that can help address this problem are:

Voluntary activities

- Organizing stream cleanups removing trash, limbs and debris before they cause blockage.
- Avoiding use of heavy equipment to "clean out" streams.
- Planting vegetation along streams to stabilize banks and provide habitat (nearly all streams could benefit from this).
- Encouraging developers to avoid extensive culverts in streams.

Current regulations

- Restrict modification of streams by such means as culverting, lining, or impounding.
- Require off-site mitigation for impacts to streams and wetlands when modifications are allowed. Like most large dams, Tims Ford Dam and Woods Reservoir Dam have chronically caused serious impacts to the Elk River from low oxygen levels as well as unnatural thermal and flow alterations in the downstream tailwaters.

Additional Enforcement

- Increased enforcement may be needed when violations of current regulations occur.

In addition, there are three streams in the Upper Elk River Watershed that have been impacted due to unnatural flow and thermal alterations caused by permitted dischargers. The batch discharge system at the Tullahoma STP has degraded Rock Creek, and some discharges from AEDC have impacted Rollins Branch and Rowlands Creek. New technology and facility design at these two facilities may be necessary to mitigate the long-standing negative effects produced by operations at these sites.